

# Systematic Review: The Effect of Covid-19 on Anxiety in Pregnant Women

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## ABSTRACT

Pregnancy is a very vulnerable period in a woman's life. Hormonal changes during pregnancy can affect emotional instability. The anxiety caused will have an impact on the health of mothers and children such as the risk of preeclampsia, premature birth, low birth weight, and fetal growth restriction. This study aims to determine the existing literature on the impact of COVID-19 on anxiety in pregnant women. This study used a systematic literature review method. The population in this study were journals from the Pubmed, Science Direct, Sage, Emerald, and Proquest databases published between 2020 and 2021. Result of study was a total of 15 of the 675 articles met the inclusion criteria. This study found that 8 out of 15 articles experienced an increase in the prevalence of anxiety in pregnant women by more than half a percent (90.5%; 57.8%; 77%; 64.5%) and experienced an increase in anxiety prevalence by more than a quarter percent (43.9%; 46.3%; 25.6%; 37.5%). In addition, this study found differences in the anxiety of pregnant women between before COVID-19 and during COVID-19 Pandemics. Anxiety in pregnant women included gestational age, demographics, socioeconomic status, knowledge, social support, and physical activity. The COVID-19 pandemic could increase anxiety in pregnant women. Mental health of pregnant women should be one of the priorities in public health to improve the welfare of pregnant women. Policymakers and health planners need to consider mental health in pregnant women in designing procedures to deal with the COVID-19 pandemic.

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## 1. Introduction

On December 31, 2019, the first case of COVID-19 was reported in Wuhan, Hubei Province, China. COVID-19 is caused by SARS-CoV-2, a new human-infecting betacoronavirus that is different from SARSCoV-1 and MERS-CoV. On March 11, 2020, the World Health Organization (WHO) declared a COVID-19 pandemic. (Corona Disease: Symptoms, 2020)

Pregnancy is the most vulnerable period of experiencing psychological disorders (Fairbrother et al., 2017; Nasreen et al., 2018). Changes during pregnancy can affect emotional instability (Baska et al., 2020; Bustos et al., 2018). On the other hand, the COVID-19 pandemic can be a risk factor for anxiety in pregnant women. According to Hassami (2020) shows that anxiety levels are higher among pregnant and postpartum women during the COVID-19 pandemic. This is influenced, First, during the COVID-19 pandemic, pregnant women feel worried about the lack of accessibility of health services (Mertz et al., 2019). Second, pregnant women are worried about contracting COVID-19 because of the potential risks that endanger the health of the mother and baby. Third, pregnant women experience more anxiety due to health status problems of their family members during the pandemic than ever before (Corbett et al., 2020). Fourth, COVID-19 in chronic disease as a high risk of complications in COVID-19 patients. Therefore, pregnant women with a history of chronic disease may be more anxious than those without (Beghi et al., 2020).

The anxiety caused can have a negative impact on pregnancy, such as an increased risk of preeclampsia, depression, nausea, vomiting, impaired labor, premature birth (Amy Leigh Rathbone & Julie Prescott, 2019). It can even cause adverse effects in infants, such as low birth weight, developmental retardation, or low APGAR scores, as well as mental and motor disorders in children with long-term effects (Biaggi et al., 2016; Salehi et al., 2020; Traylor et al., 2020). So it is necessary to take preventive measures as early as possible to prevent serious impacts on the health of the mother and fetus. Until now, there is limited information on anxiety in pregnancy during COVID-19, so we are interested in studying the effect of the COVID-19 pandemic on anxiety in pregnant women.

## 2. Method

This type of research is a narrative research with a systematic review method. This research was conducted in December 2021. The population in this study were journals from the Pubmed, Science Direct, Sage, Emerald, and Proquest databases published between 2020 and 2021. The journals taken were related to the research title, namely the impact of COVID-19 on the anxiety of pregnant women. Sampling was carried out using the PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) method which started from journal identification (identification), journal screening (screening), journal eligibility (eligibility), and journal search results (included) (Moher et al., 2009). Literature search process The keywords used in the article search were “COVID-19” AND “anxiety” AND “pregnancy”. Journal screening is done by filtering or selecting journals using those selected according to the PICO (population, intervention or exposure, comparison, outcomes) (Leonardo, 2018). Journal eligibility is done by selecting journal articles that have full text and are in accordance with predetermined inclusion criteria. The search results for journals are journals that meet the specified inclusion criteria. Journals that match the inclusion criteria were extracted data.

The inclusion criteria in this study were: (1) journals whose samples consisted of pregnant women during COVID-19 who did not have mental disorders, (2) the journals used were full-text journals, (3) the journals used were research articles, (4) the journals used have a research time span between 2020-2021, (5) the journals used are unpaid journals, (6) English-language journals. The exclusion criteria were (1) pre-proof journals, (2) inaccessible full-text journals.

The data analyzed in each journal are title, location, design, inclusion criteria, exclusion criteria, independent variables, controlled variables, and sample size. These data were collected in data collection sheets. The data in this study will be analyzed in a narrative manner.

## 3. Result and Discussion

The results of journal identification using the PRISMA method obtained 675 articles, five of which were excluded due to duplication. A total of 670 articles were reviewed for titles and abstracts and 643 articles were excluded. After eliminating irrelevant articles, we found 27 articles for thorough review and 15 articles met the requirements for analysis (Figure 1)

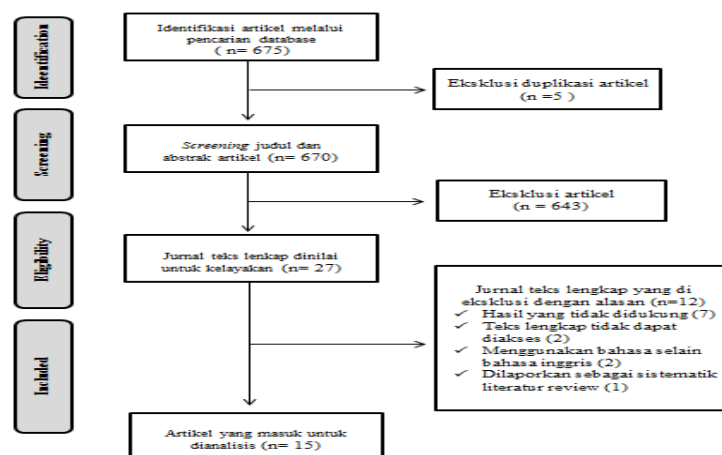


Figure 1. Literature search process following a prism flowchart

Contents lists available at [IOCScience](https://www.iocscience.com)**Science Midwifery**journal homepage: [www.midwifery.iocspublisher.org](http://www.midwifery.iocspublisher.org)**Table 1**  
Characteristics of selected studies

Author	Year	Country	Measuring instrument	Population	Result
Ding et al	2021	Cina	Self-Rating Anxiety Scale (SAS)	817	The prevalence of anxiety is 20.8%(170) with each trimester 1, 2, and 3 are 20.9%, 21.1%, and 20.7%
Hamzehgardeshi et al	2021	Iran	The Corona Disease Anxiety Questionnaire (CDA-Q)	318	The prevalence of anxiety is 4.4% (14)
Shangguan et al	2021	Cina	Skala Generalized Anxiety Disorder-7 (GAD-7)	2,139	The prevalence of anxiety was 21.7% (459) with most women reporting mild anxiety (17.8%, n = 377), and only 82 women reporting moderate to severe anxiety.
Effati-Daryani et al	2021	Iran	Depression, Anxiety and Stress Scale-21 (DASS-21)	205	The prevalence of anxiety is 43.9%
Jadaon et al	2020	Israel	Generalized Anxiety Disorder 7-item kuesioner (GAD -7)	251	The prevalence of anxiety is 57.8%(145)
Nwafor et al	2021	Nigeria	Depresi Anxiety and Stress Scale-21 (DASS-21).	456	The prevalence of anxiety is 37.5% (171)
Kahyaoglu Sut & Kucukkaya	2021	Turki	hospital anxiety and depression scale (HADS)	403	The prevalence of anxiety is 64.5% with The participants' mean HADS anxiety score was $9.6 \pm 6.4$ ,
Akgor et al	2021	Turki	hospital anxiety and depression scale (HADS)	1.225	The mean scores of HADS-A and HADS-D were $7.94 (\pm 4.03)$ and $7.23 (\pm 3.84)$ , respectively).
Mappa et al	2020	Italia	State Trait Anxiety Inventory (STAI)	178	77% (137) mothers experience anxiety, Median Nature of Anxiety Score (STAI-T) is 37 (IQR 20–43) and 68 women (38.2% 95% CI 31.3–45.5) indicates STAI-T score -40.
Liu et al	2020	Cina	Self-Rating Anxiety Scale (SAS)	1947	Prevalence of anxiety by 17.2%.
Ayaz et al	2020	Turki	Beck Anxiety Inventory (BAI)	63	The prevalence of anxiety is 90.5%(57)

Author	Year	Country	Measuring instrument	Population	Result
Suzuki	2020	Jepang	Generalized Anxiety Disorder (GAD-2)	117	The prevalence of anxiety is 25.6% (30)
Zhou et al	2020	Cina	Generalized Anxiety Disorder 7 (GAD-7)	544	The prevalence of anxiety is 6.8% (37)
Lebel et al	2020	Canada	The Promis Anxiety Adult	1987	The prevalence of moderate anxiety was 46.3% of participants, and 10.3% of very high anxiety and 56.6% of the total had clinically increased anxiety symptoms

Articles eligible for systematic review are listed in Table 1. All articles published in 2020-2021 and from various countries including China (n=3), Japan (n=1), Turkey (n=3), Italy (n=3) =1), Nigeria (n=1), Israel (n=1), Iran (n=2), Canada (n=1). All studies used a cross-sectional study design. The study involved 10,650 pregnant women during the COVID-19 pandemic.

Different measuring instruments used to evaluate anxiety have reliability and validity. Three studies used 7-item Generalized Anxiety Disorder (GAD) (Jadaon et al., 2021; Shangguan et al., 2021; Zhou et al., 2020), and one study used 2-item Generalized Anxiety Disorder (GAD) (Suzuki, 2020). Two studies used the Hospital Anxiety and Depression Scale (HADS) (Akgor et al., 2021; Kahyaoglu Sut & Kucukkaya, 2021). Two studies used the Self-Rating Anxiety Scale (SAS) (Ding et al., 2021; Liu et al., 2020). One study measured symptoms in anxiety with The PROMIS Anxiety Adult (Lebel et al., 2020). Pregnancy-related anxiety symptoms were assessed with a 10-item questionnaire about feelings about the baby's health and the circumstances of the birth. One study measured anxiety with the State Trait Anxiety Inventory (STAI) (Mappa et al., 2020). One study used the Corona Disease Anxiety Questionnaire (CDA-Q) with seventeen question items (Hamzehgardeshi et al., 2021). Two studies used the Depression, Anxiety and Stress Scale-21 (DASS-21) (Effati-Daryani et al., 2020; Nwafor et al., 2021). One study used the Beck Anxiety Inventory (BAI) (Ayaz et al., 2020).

Based on the findings of this study, the highest prevalence of anxiety in Ayaz's study (2020) was from Turkey with 90.5%. While the lowest prevalence of anxiety in the study of Hamzehgardeshi (2021) from Iran with 4.4%. The scores obtained show an increase in the average anxiety score in pregnant women due to the pandemic, (score; before COVID-19: -0.39 (SD = 0.04), COVID-19: 0.15 (SD = 0.03) ) (Liu et al., 2020), value; before COVID-19: 184.78 (SD = 49.67), COVID-19: 202.57 (SD = 52.90) (Ayaz et al., 2020). More than a quarter of pregnant women experienced an increased prevalence of anxiety (43.9%; 46.3%; 25.6%; 37.5%) (Effati-Daryani et al., 2020; Lebel et al., 2020; Nwafor et al., 2021; Suzuki, 2020) and more than half of pregnant women show anxiety (90.5; 57.8%; 77%; 64.5%) (Ayaz et al., 2020; Jadaon et al., 2021; Kahyaoglu Sut & Kucukkaya, 2021; Mappa et al., 2020). While the results of the cohort showed an average HADS-A score of 7.94 (SD = 4.03). In contrast, one study comparing pregnant women with non-pregnant women showed that the presence of anxiety symptoms was reduced during pregnancy (6.8% pregnant, 17.5% not pregnant) (Zhou et al., 2020).

We found that the level of anxiety associated with gestational age included 20.9% in the first trimester, 21.1% in the second trimester, and 21.7% in the third trimester (Ding et al., 2021). Pregnant women in the third trimester reported significantly higher scores ( $p = 0.009$ ) (Hamzehgardeshi et al., 2021). In addition, socioeconomic factors including education, occupation and income also have contributed to the severity of anxiety during the COVID-19 pandemic. Anxiety was 1.87 times greater in pregnant women who did not work than in pregnant women who worked ( $p = .047$ ) (Kahyaoglu Sut & Kucukkaya, 2021). The percentage of anxiety is more common in women with family income levels below the average (OR: 2.00, 95% CI: 1.20-3.33) (Jadaon et al., 2021). Pregnant women without academic education reported higher levels of anxiety compared to women holding academic degrees (OR: 2.45, 95% CI: 1.23-4.89) (Effati-Daryani et al., 2020; Jadaon et al., 2021; Kahyaoglu Sut & Kucukkaya, 2021). The level of education can affect a person's knowledge. Women with higher knowledge scores were less likely to experience anxiety symptoms than those with lower scores (OR = 0.847, 95% CI: 0.724, 0.990) (Ding et al., 2021; Liu et al., 2020). Prenatal anxiety is also associated with demographic factors. Pregnant women living in Hubei, China experienced

1.68 times more anxiety than those living in Chongqing (a large city in southwest China) (OR= 1.68, 95% CI = 1.32–2.13) (Shangguan et al., 2021). In addition, pregnant women were 1.81 times more likely to become anxious when no one provided daily life support either from a partner or socially (OR = 1.81, 95% CI = 1.18–2.77) (Ayaz et al., 2020; Effati -Daryani et al., 2020; Hamzehgardeshi et al., 2021; Jadaon et al., 2021; Shangguan et al., 2021). In addition, pregnant women who do not do regular physical activity have a 1.93-fold increased risk of anxiety (95% CI: 1.05–3.56) (Kahyaoglu Sut & Kucukkaya, 2021).

#### 4. Discussion

The COVID-19 pandemic is a novel infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS CoV 2) (Chan et al., 2020; Pirjani et al., 2020). The spread of the number of COVID-19 cases is fast and the high number of deaths can affect psychological health in the form of anxiety, panic, fear due to the COVID-19 pandemic (Qiu et al., 2020). Anxiety is a feeling of worry that is not clear and is usually related to worries about unforeseen dangers that will occur in the future. Individuals who experience anxiety disorders usually feel themselves not free, nervous, afraid, restless, tense, and restless. While physiological symptoms include shaking, sweating, increased heart rate, and others (Maulasari, 2017).

Antenatal anxiety levels increased significantly during the COVID-19 pandemic compared to before COVID-19 (Tomfohr-Madsen et al., 2021). Compared to the general population, pregnant women have a higher prevalence of anxiety and a lower prevalence of depression (Luo et al., 2020). Pregnant women have a higher prevalence of anxiety and depression than healthcare workers during COVID-19 (Pappa et al., 2020). Pregnant women who experience anxiety and fear cause an increase in the work of the sympathetic nervous system. To prepare the body for an emergency, the sympathetic nervous system releases hormones into the bloodstream. The autonomic nervous system then activates the adrenal glands which affect the system on the hormone epinephrine and increase adrenaline. Increased adrenaline will cause biochemical dysregulation of the body, resulting in physical tension in pregnant women and increasing overall emotional intensity (Schwartz & Graham, 2020). Anxiety disorders in pregnancy can cause adverse effects on the newborn, such as low birth weight, growth retardation, or low APGAR scores, as well as mental and motor disorders in children with long-term effects (Biaggi et al., 2016). In addition, women with increased anxiety during pregnancy are known to have an increased risk of baby blues syndrome and postpartum depression or other mood disorders (Grigoriadis et al., 2019).

In contrast, one study comparing pregnant women with non-pregnant women showed that anxiety symptoms were reduced in pregnant women during COVID-19 (Zhou et al., 2020). This may be due to the Chinese government's policies which have taken many effective measures to control the further spread of the epidemic, such as city closures, traffic control, and self-isolation, which have increased public confidence in winning the war against the epidemic. In addition, According to Zhou (2020) it may be due to several reasons, First, pregnant women have decided to get pregnant when they have better mental health and financial situation. Therefore, they have a better mental health condition than non-pregnant women. Second, pregnant women as the focus of family attention can get more emotional support from family members during the COVID-19 epidemic (Phelan et al., 2021). Third, increased contact with medical personnel can provide support and reduce symptoms of stress (Lübke et al., 2017). In addition, there is accumulating evidence that increased hormone levels during pregnancy reduce psychological disorders (Smith, 2006).

The level of anxiety has a relationship with the factor of gestational age (Ding et al., 2021). Pregnant women in the third trimester report having higher scores of experiencing anxiety (Hamzehgardeshi et al., 2021). This could be because pregnant women in the third trimester feel anxious about various things, such as whether they can give birth normally, preparing for childbirth, worrying about contracting COVID-19 in the hospital environment and infecting their babies (Çolak et al., 2021; May et al., 2020). The results of previous studies, gestational age and anxiety levels have no correlation (Effati-Daryani et al., 2020; Kahyaoglu Sut & Kucukkaya, 2021; Skouteris et al., 2009; van de Loo et al., 2018).

Socio-economic factors including education, occupation and income have also contributed to the severity of anxiety during the COVID-19 pandemic. The level of education can affect a person's perception, way of thinking in managing information and decision making. A better level of education will have a high awareness of their health conditions regarding pregnancy, childbirth, and child growth as well as in understanding the emergency of the spread of COVID-19 (Effati-Daryani et al., 2020; Jadaon et al., 2021; Kahyaoglu Sut & Kucukkaya, 2021). The higher a person's education, the more qualified his knowledge and



the more mature intellectually. Women with higher knowledge scores are less likely to experience anxiety symptoms than those with lower knowledge scores (Ding et al., 2021; Liu et al., 2020). Pregnant women who have good knowledge about pregnancy allow themselves to anticipate themselves in dealing with anxiety during pregnancy. Conversely, low knowledge will cause a person to experience anxiety due to the lack of information that the person gets. These results are in line with the literature which proves that women's anxiety levels decrease with increasing levels of education and knowledge (Akbas et al., 2021).

The COVID-19 pandemic situation has resulted in most people losing their jobs. Losing a job can affect family income. The percentage of anxiety in pregnant women during the COVID-19 pandemic is more common in women with below-average family income levels (Jadaon et al., 2021). Pregnancy requires a special budget such as the cost of nutritious food for the mother and fetus, maternity clothes, delivery costs and the needs of the baby after birth, adequate family income, so pregnant women will be better prepared to face their pregnancy.

Prenatal anxiety is also associated with demographic factors. Pregnant women living in Hubei, China experienced 1.68 times more anxiety than those living in Chongqing (a large city in southwest China) (Shangguan et al., 2021). Likewise, according to Liu (2020) that those living in areas with high infection, such as Hubei, China, showed higher levels of moderate to severe anxiety than those living in areas of lower epidemics (less affected areas in China, mainland). This finding is consistent with previous research showing that women living in disaster-affected areas have a higher risk of mental health problems (Mamun et al., 2019).

Lack of social support is one of the contributing factors to increasing prenatal anxiety during the COVID-19 epidemic (Ayaz et al., 2020; Effati-Daryani et al., 2020; Hamzehgardeshi et al., 2021; Jadaon et al., 2021; Shangguan et al., 2021). al., 2021). As is known, life during a pandemic is characterized by isolation, social distancing, and limited mobility, all of which can make women feel isolated from friends, family, and partners (Caparros-Gonzalez et al., 2020; Milgrom et al., 2019). These results are in line with previous literature that proves that social support is a protective factor in reducing the risk of depression and anxiety symptoms during pregnancy and postpartum (Gjerdingen et al., 1991; Negron et al., 2013; Nugraha et al., 2021).

The COVID-19 pandemic has caused restrictions on activities outside the home, so this has an effect on limiting physical activity. Pregnant women who do not do regular physical activity have a 1.93-fold increased risk of anxiety (Kahyaoglu Sut & Kucukkaya, 2021). Regular physical activity is able to regulate the HPA axis, reducing the hyperactivity of the sympathetic nervous system that occurs in someone with anxiety disorders (Mochcovitch et al., 2016; Stubbs et al., 2017). In addition, physical activity during pregnancy can affect cervical maturation thereby reducing the risk of prolonged labor. Physical activity during pregnancy can also help reduce medical interventions at the time of delivery, such as amniotomy, labor induction, and the risk of cesarean section (Szumilewicz et al., 2013).

Therefore, during the COVID-19 pandemic, there needs to be increased screening to examine the potential effects of the pandemic on the mental health of pregnant women. Health workers can identify symptoms of anxiety during pregnancy, and reassure pregnant women about their concerns in dealing with the COVID-19 pandemic. In addition, it is also important to expand the use of telehealth for counseling and mental health assistance for pregnant women during the COVID-19 pandemic (Renfrew et al., 2020). If these mental health problems are treated early, it prevents long term consequences on the mental health of the mother as well as the mother-infant relationship. Thus, identifying and addressing mental health problems will help provide optimal perinatal care during the pandemic.

## 5. Conclusion

Based on the results of this study, it can be concluded that most pregnant women experience increased anxiety during the COVID-19 pandemic. Factors that may affect the anxiety of pregnant women include gestational age, demographics, socioeconomic, knowledge, social support, and physical activity. The practical implications of these findings are that policymakers and health planners can consider information on mental health when designing procedures to deal with current and future pandemics. Maternal mental health should be one of the priority public health agendas to improve maternal welfare.

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